

67,200-447; TSMC 00-0890
Serial Number 09/975,855

REMARKS

Favorable reconsideration of this application in light of the above amendments and the following remarks is respectfully requested.

Claims 1-17 are pending in this application. Claims 7-8 and 16-17 are amended herein. No claims have been allowed. Claims 7-8 and 16-17 are objected to.

Claim Rejections - 35 U.S.C. § 103

The Examiner has rejected claims 1-4, 6, 9-13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Kanata (U.S. Patent No. 5,667,923) in view of Hirayanagi (U.S. Patent No. 6,180,289).

Kanata (abstract and cover figure) teaches a charged particle beam exposure method that divides exposure patterns into small regions and compensates for backscattering from a patterned layer underlying a resist layer.

Hirayanagi (abstract and cover figure) teaches a projection microlithography mask and mask substrate separate therefrom.

Within the paragraph bridging pages 2-3 of the office action made FINAL, the Examiner reads Kanata onto applicant's foregoing claims. At page 3, last paragraph, of the office action made FINAL, the Examiner further concludes that Kanata teaches most elements in applicant's foregoing claims to applicant's invention.

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At page 4, first paragraph of the office action made FINAL, the Examiner acknowledges that Kanata does not teach a charged particle beam method employing a series of adjacent fractured pattern elements within a contiguous latent pattern, where an adjacent pair of pattern elements is separated by a gap. Rather, at page 4, second paragraph of the office action made FINAL the Examiner cites Hirayanagi as teaching that feature of applicant's invention. In particular, the Examiner cites that a gap is formed by Hirayanagi's retention member as disclosed at Fig. 1c and col. 2, lines 5-10.

Within the paragraph bridging pages 4-5 of the office action made FINAL, the Examiner first notes that the foregoing references are analogous art since they are drawn to charged particle beam methods. The Examiner asserts that it would have been obvious "to use the mask of Hirayanagi in the method of Kanata, as the mask of Hirayanagi can be employed without direct writing which allows for relatively high wafer throughput and decreased costs." The Examiner also predicates reasonable expectation of success in using the mask of Hirayanagi, "as Kanata teaches that the charged particle beam method is performed with a mask."

Within the Response to Arguments of the office action made FINAL, the Examiner further cites Hirayanagi at col. 3, lines 5-7 as teaching that "mask reticles are mask subfields, where each subfield comprises a respective portion of the overall pattern to be transferred from [a] mask to [a] substrate." The Examiner further asserts that "each subfield, or mask reticle, is a fractured pattern element," in accord with applicant's claimed invention.

In response in a first instance, applicant asserts that claim 1 and claim 11 may not properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi as combined by the Examiner insofar as each and every element within applicant's

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invention as disclosed and claimed within claim 1 and claim 11 is not taught within Kanata and Hirayanagi as combined by the Examiner.

In that regard, applicant notes that applicant's fractured pattern elements (at least one adjacent pair of which is separated by a gap, and as the Examiner acknowledges as absent within Kanata) are present within applicant's contiguous latent pattern within applicant's charged particle beam exposed blanket resist layer. While Hirayanagi, as cited by the Examiner, may arguably be interpreted as teaching fractured pattern elements, the same are clearly not present within a contiguous latent pattern in general, or more particularly within a contiguous latent pattern within a charged particle beam exposed blanket resist layer, as required within applicant's invention as disclosed and claimed within claim 1 and claim 11.

Thus, since each and every limitation within applicant's invention as disclosed and claimed within claim 1 and claim 11 is not taught within Kanata and Hirayanagi as combined by the Examiner, in particular with respect to a series of fractured pattern elements formed within a contiguous latent pattern within a charged particle beam exposed blanket resist layer, applicant asserts that claims 1 and 11 may not properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi. Since all remaining claims within the foregoing rejection are dependent upon claim 1 or claim 11 and carry all of the limitations of claim 1 or claim 11, applicant additionally asserts that those remaining claims may also not properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi.

In response in a second instance, applicant asserts that no suggestion or motivation for modification or combination of Kanata with Hirayanagi exists for reasons as

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proposed by the Examiner. Further, the reasons as proposed by the Examiner while applicable to Hirayanagi do not appear to be applicable to Kanata.

In that regard, applicant first again notes that the Examiner within the paragraph bridging pages 4-5 of the office action made FINAL asserts that it would have been obvious "to use the mask of Hirayanagi in the method of Kanata, as the mask of Hirayanagi can be employed without direct writing which allows for relatively high wafer throughput and decreased costs" (as taught by Hirayanagi at col. 2, lines 45-50). The Examiner apparently accurately cites Hirayanagi. On the other hand, Kanata (abstract and cover figure) is directed towards a charged particle beam exposure method that compensates for a proximity effect. Kanata's charged particle beam method provides for areal differences in charged particle beam exposure parameters for a resist layer to compensate for backscattering from a patterned layer underlying the resist layer. Thus, direct charged particle beam writing is required within Kanata's invention since areally different charged particle beam exposures when exposing a resist layer are apparently not obtained absent a direct write method.

Thus, since the Examiner predicates suggestion or motivation for modification or combination of Kanata with Hirayanagi upon reasoning applicable to Hirayanagi but not apparently applicable to Kanata with respect to avoidance of a direct write method, applicant asserts that Kanata may not properly be combined with Hirayanagi for reasons as cited by the Examiner. As a result thereof, applicant also asserts that none of applicant's claims to applicant's invention may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi.

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In light of the foregoing responses, applicant respectfully requests that the Examiner's rejections of claims 1-4, 6, 9-13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi be withdrawn.

The Examiner has rejected claims 5 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi and further in view of Ausschnitt (U.S. Patent No. 5,629,772).

Ausschnitt is cited as teaching a positive photoresist. The Examiner at page 5, third paragraph of the office action made FINAL, acknowledges that the same is absent within Kanata in view of Hirayanagi. The Examiner at page 5, last paragraph of the office action made FINAL, rationalizes suggestion or motivation for modification or combination of Kanata in view of Hirayanagi with Ausschnitt upon Ausschnitt's teaching "that it is common in the art to use both negative and positive resists in lithographic exposure processes."

In response, applicant predicates patentability of claims 5 and 14 upon their dependence upon claims 1 and 11.

In light of the foregoing response, applicant respectfully requests that the Examiner's rejections of claims 5 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Kanata in view of Hirayanagi and further in view of Ausschnitt be withdrawn.

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Allowable Subject Matter

The Examiner has objected to claims 7-8 and 16-17 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response, applicant has amended claims 7-8 and 16-17 to incorporate therein the limitations of claims 1 or 11, thus providing claims 7-8 and 16-17 as independent claims.

Other Considerations

The Examiner has cited no additional prior art of record not employed in rejecting applicant's claims to applicant's invention. A fee is due as a result of this amendment and response. The Commissioner is hereby authorized to charge Deposit Account No. 50-0484 the fee due.

SUMMARY

Applicant's invention as disclosed and claimed within claims 1, 7-8, 11 and 16-17 is directed towards a method for forming a patterned resist layer or a method for forming a photomask. Each of the methods employs a charged particle beam exposed resist layer having a contiguous latent pattern comprising a series of adjacent fractured pattern elements, at least one pair of which is separated by a gap. The same is absent within the prior art of record. Also absent is a suggestion or motivation to combine the prior art to provide the same.

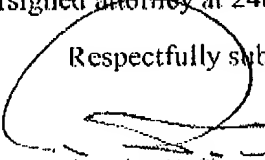
CONCLUSION

On the basis of the above amendments and remarks, reconsideration of this application, and its early allowance, are respectfully requested.

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Any inquiries relating to this or earlier communications pertaining to this application may be directed to the undersigned attorney at 248-540-4040.

Respectfully submitted,



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